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Effect Of Aqueous Extract Of Carica Papaya Back And Seed On The Liver Of Male Adult Wister Rats

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Abstract: ***Different parts of the plant Carica papaya are attributed with different medicinal values. it has been widely used in folk medicine in the treatment of warts, cancers, tumors, syphilis, urine, hemorrhoids and other ailments. This study is aimed to evaluate the effect of aqueous extract of Carica papaya seed and peels on the liver of male albino wistar rats. 35 adult male wistar rats weighing 180g after acclimatizing were divided in groups of equal number of 1-7 which group 1 was control giving only rat chow and water and 2-4 was administered 100mg/kg, 200mg/kg and 400mg/kg of seed extract and 5-7 of same amount of peels extract orally for the period of 28 days, at the 29 day the rats were weighed and blood samples were collected for biochemical and hormonal analysis through ocular puncture and sacrificed by chloroform sedation, the liver were harvested and fix in 10% formalin for histological analysis. The result reveals significant increase in liver enzymes examined across the groups especially in the group 3, 6 and 7 and which indicate high level of toxicity and damage in the liver enzymes; the histo-pathological analysis showed no alteration or any pathological concern the slides. Conclusively, following the dosage of oral administration of aqueous extract of carica papaya seed and peels extract showed sign of toxicity in the experimental rats, these is advice not to be used in treatment of liver diseases and if consumption for any other purpose, it is advisable to take caution on the dosage.***

Keyword: liver, carica papaya, seed, peels.

I. INTRODUCTION

Carica papaya (family: Caricaceae) is a widely grown, perennial tropical tree, which grows up to 5 to 10 m tall with an erect and branchless trunk. Its leaves are large, 50-70 cm in diameter, deeply palmately lobed with 7 lobes (Duke, 1984). Its melon-like fruit (papaya) is known by different names in different parts of the world and these include fruta bomba (in Cuba), lechoza (in Venezuela, Puerto Rico, the Philippines and the Dominican Republic) and papaw (Sri Lankan) (Lohiya et al., 2002). In Nigeria, it is also known by different local names depending on the tribe. For example, among the Yoruba (South-West Nigeria) it is known as "Ibepe" and "sigun", "gwanda" among the Hausa (Northern Nigeria), "ojo" and "okwere" among the Igbo (South-East Nigeria), "etihi-mbakara" among the Efik (South-South Nigeria).The ripe fruit is edible and is usually eaten raw, without the skin or seeds. The unripe green fruit (which is a rich source of vitamin A) can be eaten cooked, usually in curries, salads and stews as used in Thai cuisine (Lohiya *et al*., 2002).

Different parts of the plant are attributed with different medicinal values. For example, in African traditional

medicine, the boiled green leaves of papaya combined with leaves of Azadirachta indica, Cymbopogon citratus, Psidium guajava and stem bark of Alstonia boonei boiled together and the hot infusion is drunk as one wine glass full thrice daily in the treatment of malaria (Gill, 1992). Its fresh leaves are also efficacious in the treatment of gonorrhea, syphilis and amoebic dysentery (Gill, 1992). The milky juice of the unripe fruit is a powerful abortificant, anti-helminthic for roundworms, stomach disorders and enlargement of liver and spleen (Gill, 1992). The seeds are also effective as a vermifuge and in the treatment of hypertension, diabetes mellitus and hypercholesterolemia (Gill, 1992). Results from studies on biological activities of Carica papaya parts, extracts and isolated compounds showed that the latex and root extracts inhibited Candida albicans while extracts of pulp and seeds showed bacteriostatic properties against Staphylococcus aureus, Escherichia coli, Salmonella typhi, Bacillus subtilis, and Entamoeba histolytica, (Emeruwa, 1982). Its root aqueous extract has equally been shown to have purgative effect (Akah *et al*., 1997).

The major active ingredients (carpine, chymopapain, papain, bactericidal aglycone, benzyl isothiocyanate, aglycoside, sinigrin, the enzyme myrosinand carpasemine) are present in the seeds. The fleshy part of the fruits (mesocarp) is a delicacy and nutrient-rich drinks of high demand are produced from them. However, some of the active substances (e.g. carpine and papain) from pawpaw are toxic. Carpine are present in traces in the black seeds of C. papaya. In large quantities, it is used to lower the pulse rate and depress the nervous system.

Papaya peel is often used in cosmetics. The papaya peel can also be used in many home remedies, which the presence of vitamin A helps to restore and rebuild damaged skin when mixed with honey.

The liver is the largest gland in the body and, after the skin, the largest single organ (Moore *et al.,* 2006). Except for fat, all nutrients absorbed from the digestive tractare initially conveyed to the liver by the portal venous system. The liver stores glycogen and secretes bile, a yellow-brown or green fluid that aids in the emulsification of fat. The liver produces bile continuously; however, between meals it accumulates and is stored in the gall bladder, which also concentrates the bile by absorbing water and salts (Moore *et al*., 2006).

Based on the available scientific evidence that *Carica papaya* has been widely used in folk medicine in the treatment of many diseases and considering that the liver and the testes are important organs in the body, it is therefore necessary to further determine the possible effect of the aqueous extract of *Carica papaya* seeds and peels (back) on the liver.

II. METHOD

Thirty-five (35) male Wister rats weighing between 150-180g were housed in wooden cages and allowed to acclimatize for two weeks before administration. The rats were feed with rat chow and water throughout the duration of the experiment. Rats were handled according to global best practices. Carica papaya was gotten from a garden in Anambra state and the peels were gotten and slice into equal part and seed were removed, both dried and aqueous extract was prepared.

GROUP	ANIMAL	EXTRACT	DOSAGE	DURATION
1	5	Nil	Nil	28
2	5	Aqueous extract of C.P seed	100mg/kg	28
3	5	Aqueous extract of C.P seed	200mg/kg	28
4	5	Aqueous extract of C.P seed	400mg/kg	28
5	5	Aqueous extract of C.P peel	100mg/kg	28
6	5	Aqueous extract of C.P peel	200mg/kg	28
7	5	Aqueous extract of C.P peel	400mg/kg	28

Table: 1.0: Animal grouping and dose distribution

The animals were kept under adequate sanitary condition with natural sun-light and adequate ventilation.

On the 29 day the animals were weighed as it was done before, blood where collected via ocular puncture for liver enzymes text, after which were sacrificed by chloroform sedation and the liver was harvested and fixed in Bouins Fluid for histopathological studies.The data obtained were analyzed using statistical package for social sciences (SPSS) version 20.0 and the result expressed as mean ± standard Error of mean (SEM) significant differences of the result were established by one-way Analysis of Variance (ANOVA) and the acceptances level of significance was $p< 0.05$ for all the results.

III. RESULT

	Period	N	Mean±Std
GROUP A	BEFORE	5	93.75±4.79
	AFTER	5	182.50±6.46
GROUP B	BEFORE	5	101.25±2.50
	AFTER	5	153.00±10.13
GROUP C	BEFORE	5	120.00±8.17
	AFTER	5	155.00±5.78
GROUP D	BEFORE	5	110.00±11.55
	AFTER	5	182.00±2.83
GROUP 5	BEFORE	5	120.00±8.17
	AFTER	5	180.00±2.83
GROUP 6	BEFORE	5	110.00±11.55
	AFTER	5	146.00±10.16
GROUP 7	BEFORE	5	120.00±8.17
	AFTER	5	153.00±10.13

Table: 2.1: Comparison of rats weight before and after experiment

All data were analysed using student dependent T-test and were considered significant at $P<0.05$, $P\leq0.05$ means significant, and $P>0.05$ means not significant. Result from table 2.1 showed a significant ($P<0.05$) increase in the body weight when the test groups were compared to the normal control group (group A), group 5.6 and 7 showed significant decrease when compared to group 2,3 and 4.

Organ weight (G)	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
Liver	4.55± 0.64	5.10±0 .35*	5.92±0 .62*	6.55±0 .62*	5.05±0 .35*	4.80±0 .23	4.55±0. 34

Table 2.2: Comparing the organ weight of the experimental groups to that of the control

Table 2.2: Showed organ weight for test and between groups showed significant difference in the seed groups, and the peel group 5, when compared to the control. Group 6 and 8 increase slightly, but not significant. Data showed mean Analysis of variance (ANOVA) and standard deviation weights of the liver ($p<0.05$).

GROUPS	AST	ALT	ALP
1	16.50±0.35	20.77±0.55	95.00±2.04
2	24.80±1.65*	10.80±0.73*	50.81±4.27*
3	21.36±1.32	11.22±1.52*	70.66±6.35*
4	19.20±0.50	11.54±1.50*	51.70±3.25*
5	19.40±0.62	15.36±2.66*	72.45±5.42*
6	26.54±1.44*	12.37±3.52*	76.55±4.42*
7	32.54±0.15*	10.84±3.62*	60.23±4.32*

**P<0.05 when compared with the control.*

Table 2.3: Result Of Liver Enzymes

There was significant increase ($p<0.05$) in AST in group 2, 6 and 7 when compared with the control (A). However, there was no significant increase ($p>0.05$) in AST in rest groups when compared with the control (A).There was significant decrease ($p<0.05$) in ALT in all the text group groups when compared with the control (A).There was significant decrease ($p<0.05$) in ALP there was significant decrease in all the group compared with control (A)

HISTOLOGICAL FINDING

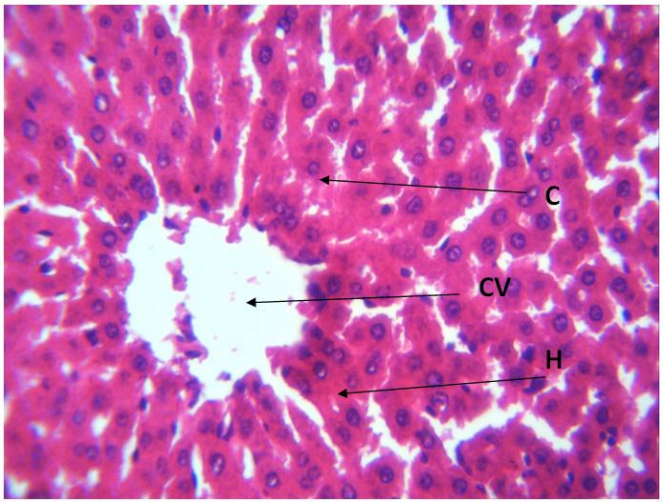

Figure 1: Photomicrograph of group 1 control section of liver (4OO)(H/E) shows well perfused normal hepatic tissue with central vain (CV), cytoplasm(C) and hepatocytes (H)

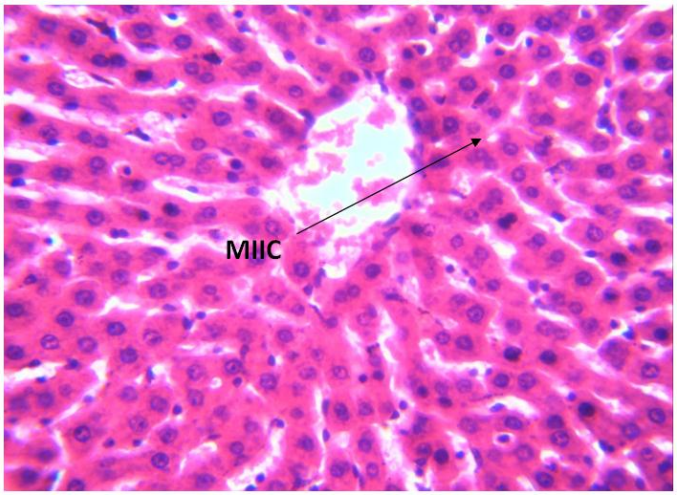

Figure 2: Photomicrograph of group 2 section of liver administered with carica papaya seed (400)(H/E) shows well perfussed hepatic tissue with mild infilteration of inflammatory cell (MIIC)otherwise normal

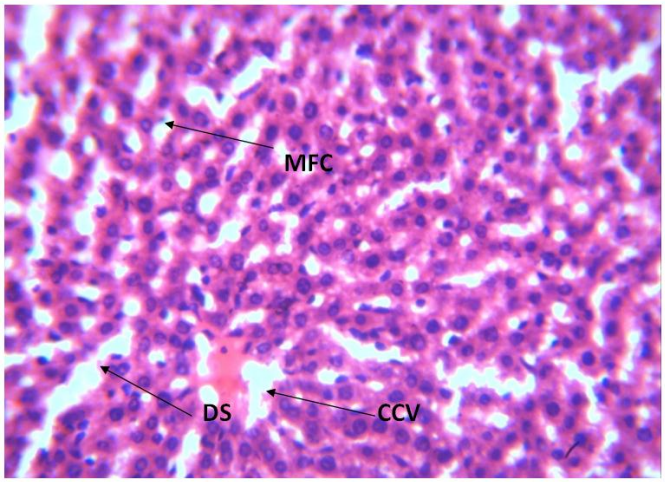

Figure 3: Photomicrograph of group 3 section of liver administered with 200mg/kg of carica papaya seed shows moderate conjestion of the central vain (CCV), moderate fatty change fatty change (MFC) and dilation of the sinusoid(DS)

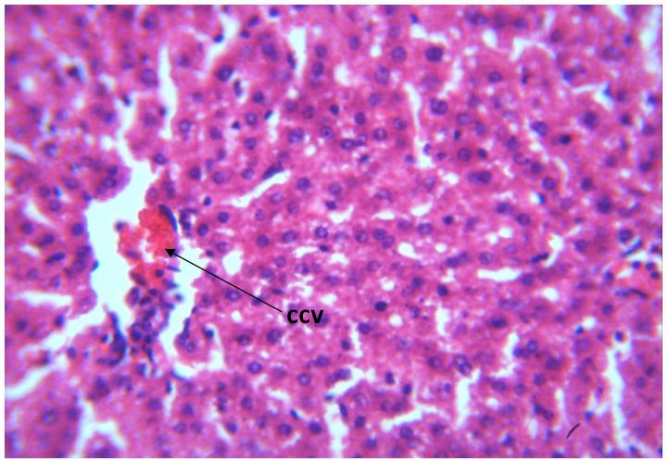

Figure 4: Photomicrograph of group 4 section of liver administered with 400mg/kg of carica papaya seed (x400)(H/E) shows moderate infilteration of inflammatory cell (MIIC) and mild fatty change fatty change(MFC) and congested central vain

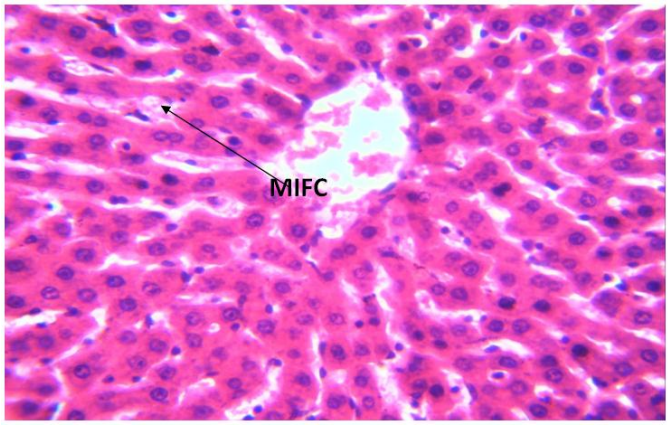

Figure 5: Photomicrograph of group 5 section of liver administered 100mg/kg of carica peel(400)(H/E) shows well perfussed hepatic tissue with mild infilteration of inflammatory cell

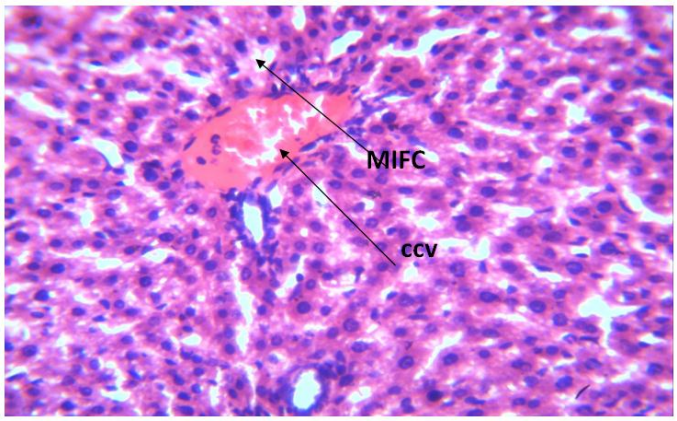

Figure 6: Photomicrograph of group 6 section of liver administered with 100mg/kg of carica papaya peels (400)(H/E) shows mild regeneration with moderate fatty change (MFC) mild congestion of the central vain (CCV)

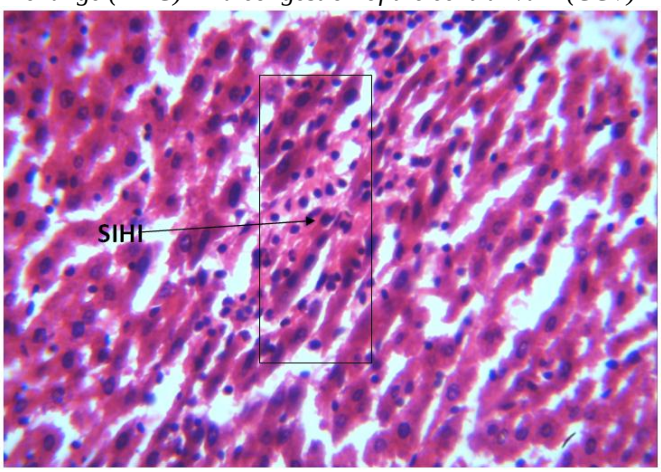

Figure 7: Photomicrograph of group 7 section of liver administered with 400mg/kg of carica papaya peels (400)(H/E) shows severe damage on the hepatic tissue with intra hepatic inflammation (IHI) (portal hepatitis) and severe fatty changes

IV. DISCUSSION

Carica papaya seed extract exhibited a lot of medicinal relevance which is not different with other part of the carica papaya tree, these makes the tree a medicinal plant. Chewing the seeds of ripe pawpaw fruit also helps to clear nasal congestion, (Elizabeth,1994). The green unripe pawpaw has a therapeutic value due to its antiseptic quality. It cleans the intestines from bacteria, more so that (only a healthy intestine is able to absorb vitamin and minerals, especially vitamin B12), anti-helminthic for roundworms, stomach disorders and enlargement of liver and spleen (Gill, 1992). C.papaya peels has been said to have cosmetic values, which is help in smoothening skin. Papaya peels been seen to shirked after a short period of time unlike other parts of the papaya tree.

The seed and peels of papaya have different Chemical constituents, plants constituents are known to be influenced by season, age and geographical location. There is a presence of saponins, flavonoids, Tanins, alkaloids, terpenoids, reducing sugar, amino acids, fats, protein, phenol, vitamin, sterols and terpenes at different quantity. The presence of these metabolites suggests great potential for the plant as source of useful phytomedicines. The presence of flavonoids and resins might be responsible for its use as anti-inflammatory recipe in Chinese folkloric medicine as some flavonoids has anti-inflammatory effect on both acute and chronic inflammation. Plants that possess alkaloids are known for decreasing blood pressure and balancing the nervous system in case of mental illness. The presence of tannins could also shows that it is an astringent, help in wound healing and anti-parasitic (Egharevba *et al*., 2010). Alkaloids are known to possess anti-malaria property; hence the plant may be a good source of anti-malaria for which it is traditionally uses in locally (Nnama *et al.,* 2018). The use of *CARICA Papaya* as genital stimulant may be attributed to the presence of alkaloids. Plant containing saponins are believed to have antioxidant, anti-cancer, anti-inflammatory, and anti-viral properties (Egharevba *et al*., 2010). Variations also occur in the distribution of constituents in the distribution of constituents in different organs of plants (Nnama *et al.,* 2018).

General toxicity can be accessed through organ weight measurements, in which changes in the body weight and organ weight is a sensitive indicator of toxicity (Thanabhorn *et al*., 2006; Norazmir and Ayub, 2010). The result of body weight and organ weight showed significant weight increase across the test group, which signifies that the extract didn't impair appetite, reason seen in the rat weight. Organ weight between text groups showed significant difference in the seed groups compared to the peels, which peel is seen to be closer to the control, which pose a fact that little or no effect of the peel effect on the liver was seen.

The result of the study revealed that following the administration of aqueous extract of *Carica papaya* that the level of AST increased only in group 2,6 and 7 while ALT and ALP showed significant increase across the experimental group and this is in the support of the work of (Nnama *et al.*,2018). The presence of Alkaliods, Flavonoids and Tanin in *carica papaya* seeds and peel increase in Serum ALP is a useful indicator to diagnose intra hepatic and extra hepatic bile obstruction in the liver. Also reported that enhancement in the

level of serum proteins is an indication of tissue injury and reflection of hepatic toxicity. Serums ALT and AST considered in this study are important and play significant role in the diagnosis of liver cytolysis (Peters and Boyd, 1966).). Tissue enzyme assay can also indicate tissue cellular damage long before structural damage can be picked up by conventional histological techniques. Such measurement can also give an insight to the site of cellular tissue damage as a result of assault by the plant extract (Adebayo *et al.*, 2003). that rats without oxidative stress leads to increase in weight, and carica papaya seed and peel has showed to improve certain liver function but suffered in the histology architecture and could mean oxidative stress which lead to default in histological architecture.

The histology of the liver treated with 100ml, 200ml and 400ml of *c*arica *papaya* seed and peels extracted showed moderate to severe degeneration and moderate portal aggregate of inflammatory cell and moderate fatty change and dilation of the sinusoids and congestion of central vain. This indicates that papaya seed and peels may have curative effect to several illments and body weight and physical activity can still be normal, but liver tissue is been destroy gradually according to the dose intake.

V. CONCLUSION

On the available scientific evidence that *carica papaya* has been widely used in folk medicine in the treatment of warts, cancers, tumors, syphilis, alkalizine, urine, hemorrhoids and other ailments and considering the fact that the liver is an important organs in the body and our findings therefore suggest that *carica papaya seed and peels* extract has the capacity to regulate water balance and can cause significant damage to the liver tissue especially when taken as unripe seed and peel.

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